THE DENTAL PRACTITIONER
AND DENTAL RECORD

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THE DENTAL PRACTITIONER AND DENTAL RECORD

Vol. XI, No. 3 November, 1960

EDITORIAL

KEEPING THE PATIENTS WHEN YOU GET THEM

THE dentist is probably the most unpopular person, professionally speaking, in any community. No patient seems to be able to approach the dental surgery with feelings other than apprehension or downright fear.

Why should this be? More than a hundred years have passed since the birth of anæsthesia and its use in the practice of dentistry. Since that time all manner of steps have been taken to alleviate and reduce the pain of dental treatment. Need patients really suffer discomfort while undergoing dental treatment?

The depressing appearance and atmosphere of the surgery of even thirty years ago has now been replaced by the use of light, bright, and cheerful colours in the furnishings and the modern equipment. Those monstrous octopi hanging over the patients while they sit in the chair are disappearing, with streamlined, well-planned dental units taking their place. The decentralization of equipment has brought it to a lower visual level, making it all a less terrifying conglomeration of apparatus.

The introduction of tranquillizers has in recent years produced means whereby the sensitive person can arrive in the dentist's waiting-room in a calmer and more tranquil frame of mind. This is particularly so in the case of children who have had a previous unhappy experience when receiving dental treatment. Considerable discussion has taken place regarding the wisdom of using these drugs because of the side-effects produced. Most of these side-effects are the result of long-term administration in high dosage. The dentist would naturally use tranquillizers for a few doses over short periods, thus minimizing any deleterious effect. Care should be taken to give the correct dosage in relation to body-weight and metabolic rate. These therapeutic treatments can be continued by the use of audio-analgesic equipment in the surgery.

The painful sensations of dental operations have been eliminated by the use of surface and local anæsthetics. The discomfort of vibration as well as the long drilling procedures have been reduced by the advent of the high-speed rotary instruments. With all these improvements in our practice of dentistry much of the apparent ruthlessness of the dentist can be effectively dissipated.

But has it really? Do we take advantage of these aids in our practices? Are we creating confidence in our patients, and thus bringing them more frequently to our surgeries for routine treatment, and, through them, initiating new patients into the value of routine examination and the alleviation of dental disease?

All the good work of the agencies who are promoting campaigns to persuade the public to take advantage of the facilities offered by the dental profession will come to naught if we do not ourselves eliminate the basic fear of the dentist.

THE MANAGEMENT OF PERICORONITIS

By **LESTER W. KAY**, F.D.S. R.C.S., M.R.C.S., L.R.C.P.
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ALTHOUGH pericoronitis, or inflammation around the crown of an erupting or partially erupted tooth, is seen frequently in general practice, the subject of its management is neglected in the dental literature. In the majority of cases, early treatment of a simple nature can control the infection and quickly relieve the patient of his symptoms.

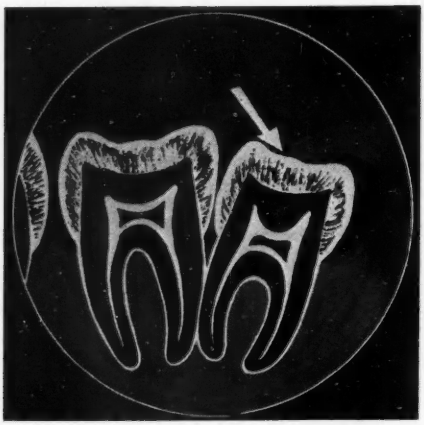

Fig. 1.—An arrow identifies the potential space formed between the gum-flap and the partially erupted tooth.

Fig. 2.—The tilt of a mesio-angular third molar, producing a mesial extension to the stagnation area.

Pericoronal infection may occur around any erupting tooth, but clinically it is the third mandibular molar which is most commonly involved. The cusps of this tooth may be exposed in part or covered completely by gingival tissue. In both circumstances, a potential space exists between the occlusal surface and the overlapping flap which may harbour debris (*Fig.* 1). This is an ideal environment for bacterial growth, and the dimensions of the area of stagnation may vary according to the axial tilt of the tooth, e.g., a mesio-angular impaction deep to the gum-pad can cause a wedge-shaped deepening mesially (*Fig.* 2).

In continuity with the space lies a deep pocket, formed anteriorly by the distal aspect of the crown and bordered posteriorly by the thick fibrous retromolar pad or bone underlying it. This is lined by remnants of the outer connective tissue layer of the dental follicle. Kelsey Fry (1958) has suggested that pericoronal infection is due to bacterial invasion of this follicular pouch. As a result of the "folliculitis" the overlying soft tissues become œdematous and inflamed, producing the classical clinical picture of pericoronitis. No precise studies are recorded which either confirm or disprove this theory.

Any general or local condition which tends to lower the patient's resistance may predispose to an attack of pericoronal infection. Some possible factors are:—

General.—Lowered resistance from mental stress, physical fatigue, or concurrent illness.

Local.—

1. Pressure of the erupting tooth against the resistant pad of tissue known as the operculum, capuchon, or hood of gum.

2. The traumatic effect of the cusps of an opposing tooth which crushes the gum-flap each time the patient bites.

3. Lack of oral hygiene by neglect or from functional loss or anatomical difficulties. Thus, the area with its foreign matter and bacterial colonies is undisturbed and the flora reproduces rapidly.

4. The retromolar area is a primary incubation zone for organisms associated with ulcerative gingivitis, and should this condition ensue, pericoronitis may supervene.

DIAGNOSIS

Although it may seem superfluous advice, dental practitioners should ensure that the patient's symptoms *are* attributable to pericoronitis. Every oral surgeon has had cases referred to him with obvious pulpal pain diagnosed incorrectly as being due to this soft tissue infection. Careful history-taking (Grundy, 1957) and clinical examination aid the avoidance of this humiliating pitfall for the unwary.

Depending upon clinical features present at the time of examination, pericoronitis may be classified as chronic, subacute, or acute.

Usually, *chronic pericoronitis* is quiescent and symptomless. However, occasionally the patient may complain of a slight discomfort due to irritation of the gum-flap, or of an unpleasant taste from transient suppuration in the area of the crown.

In *subacute pericoronitis* there is a localized dull pain, gradual in onset, and occurring principally on mastication. The operculum is red, swollen, tender, and sometimes ulcerated —a careful examination of the interdental papillæ and gingival margins of neighbouring teeth should be made to exclude Vincent's infection. Also, it is salutary to remember the rare early oral manifestation of a blood dyscrasia as an ulceration in the lower third molar region (Salmon, 1939). A tooth surface is visible or felt on passing a probe down the sinus, from which a discharge of pus may be noticed. Invariably the affected $\overline{8}$ is vital and not sensitive to percussion, but the presence of stagnation favours the development of caries with possible pulpal involvement and the extension of infection into the periapical tissues. In most cases the submandibular lymph-nodes are enlarged and tender.

Acute pericoronitis is more severe, sometimes complicated by extra-oral signs and systemic disturbances. The common clinical features are:—

1. A tender swelling may be present intra-orally and in the soft tissues of the face and neck adjacent to the mandible.

2. Difficulty is experienced on opening the mouth and the degree of limitation should be noted because its improvement is a useful clinical guide to the efficacy of treatment.

3. Often the pain is constant, throbbing or dull in character, radiating to the ear or into the floor of the mouth. It is not exacerbated by the ingestion of hot, cold, or sweet substances, but mouth closure in the presence of an impingeing maxillary tooth increases the severity.

4. Fœtor oris is to be anticipated because the patient avoids eating on the affected side and is discouraged by pain from using a tooth-brush.

5. Lymphadenitis is marked and may extend to the outer collar of glands, the deep cervical group, which are enlarged and tender on palpation.

6. Variable systemic reactions occur, but malaise with a raised temperature and an increased pulse-rate are the most frequent.

Possible Sequelæ.—

Localized abscess formation or dissemination and the anatomical environment dictates the trend.

Posteriorly, the retromolar area is bounded by the buccinator and superior constrictor muscles, which are united by the pterygomandibular raphe. The ramus is sandwiched between the medial pterygoid and masseter, and medial to it is the palatoglossus, forming the anterior tonsillar pillar. On the inner surface of the mandible, posterior fibres of the mylohyoid muscle take origin from the mylohyoid line as far back as the posterior surface of the third molar tooth.

Because of these important anatomical relationships, explained concisely by Tulley (1952), the lower third molar region is a veritable gateway to important fascial planes and surgical spaces within the head and neck.

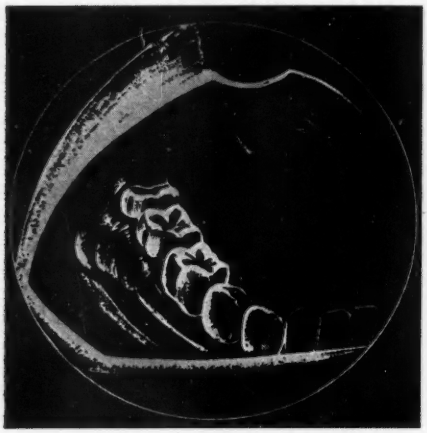

Fig. 3.—Abscess formation restricted to the pericoronal region.

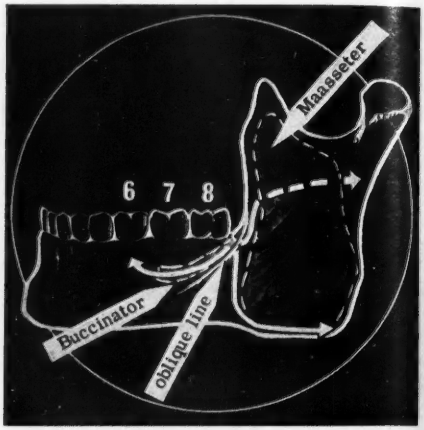

Fig. 4.—A diagram showing the tracking of pus to the position of the first molar and posterior spread over the ascending ramus and angle of the mandible.

Fig. 5.—Swelling of the anterior faucial pillar with deflexion of the uvula as a result of pericoronitis.

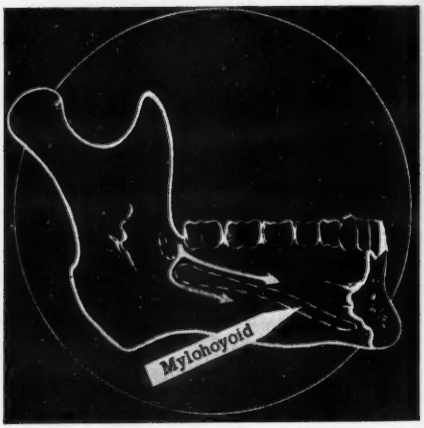

Fig. 6.—This view indicates how the attachment of the mylohyoid muscle may allow pus to collect superficial or deep to the floor of the mouth.

If infection travels along these *pathways*, the consequences may be serious:—

1. Pus may remain deep-seated within the retromolar region and displace the gingival tissue of $\overline{7}$, forming a *pericoronal abscess* (*Fig.* 3).

2. Infiltrate the muscular plane of the cheek, causing a *facial swelling*.

3. Inside the line of the buccinator attachment to the retromolar pad and external oblique line, pus may be deflected downwards and forwards *to point in the buccal sulcus alongside* $\overline{6}$ which may lead to an erroneous diagnosis of a periapical abscess of the first molar (*Fig.* 4).

4. Infection can insinuate behind or burst below the buccinator, causing a *mandibular subperiosteal abscess*, which may reach backwards lateral to the masseter to produce a *brawny induration over the ramus and angle.*

5. Burrow backwards, above the insertion of the masseter into the lower part of the ramus, and pass between the muscle and bone *to distend the pre-auricular region.*

6. Lingual disposal of pus can take one of three routes:—

a. Along the palatoglossus, protruding the anterior faucial pillar and extending as a

Fig. 7.—Radiographic evidence of bone-loss over the crown of a lingually deflected lower third molar. Pericoronitis in this situation may lead to serious complications.

tense, red swelling of the soft palate which deflects the uvula and simulates a *peritonsillar abscess* (*Fig.* 5).

b. Beneath the mylohyoid muscle into the submandibular space, *raising the floor of the mouth* (*Fig.* 6).

c. Under the mucous membrane alongside the tongue on the upper surface of the mylohyoid, forming *a sublingual abscess.*

Tracking of pus in these directions is rare, but, invariably, pathognomonic of the tooth in lingual obliquity (*Fig.* 7). The important danger signs of tenderness and induration in the floor of the mouth are determined on palpation and by comparison of the two sides. If the trismus is too marked to permit the insertion of a finger, the examination may be made with a dental mirror handle.

7. *The lateral pharyngeal wall is pushed medially* as a result of abscess formation between the superior constrictor medially and the ramus and medial pterygoid laterally.

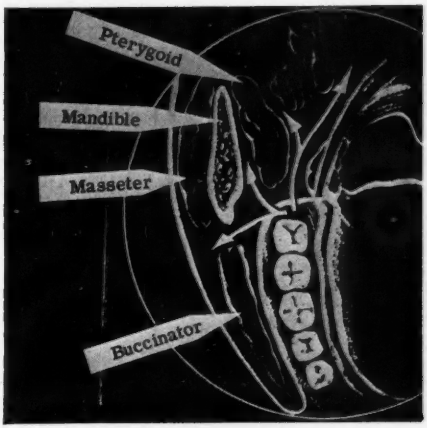

Fig. 8.—The proximity of important anatomical planes to the retromolar region can determine the movement of pus. The lateral pharyngeal and pterygomandibular spaces illustrated are concerned in this respect.

The lateral pharyngeal abscess may be an extension of suppuration within the *pterygomandibular space* to which pericoronal infection also tracks (*Fig.* 8).

8. Serious complications which have been reported include: severe types of cellulitis in which spaces are involved simultaneously, such as Ludwig's angina; retropharyngeal and temporal space abscesses; laryngeal œdema; cavernous sinus thrombosis; and acute meningitis.

Treatment.—*Although in the majority of cases, early treatment of a simple nature can control the infection and speedily relieve the patient of his symptoms, untreated cases are referred regularly to hospital by dental practitioners who believe mistakenly that immediate extraction of the tooth is required. Delay in instituting appropriate measures allows the*

infection to become more severe, painful, and extensive, so that elaborate therapy is then needed to control it.

The following treatment plan is recommended for use by a general dental practitioner:—

1. If the space is accessible, syringe with warm saline or eusol to dislodge the bacterial substrate. A Higginson's syringe fitted to a fine nasal catheter is suitable.

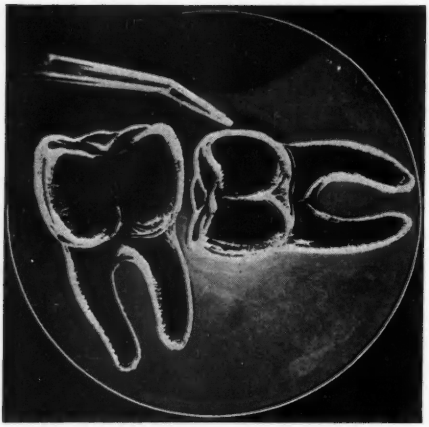

Fig. 9.—An important aspect of treatment: the cauterization process involving the use of College tweezers.

2. Dry the retromolar area, isolate with cotton-wool rolls, and use an antiseptic, trichloracetic acid (strength 40 to 50 per cent), to obtain drainage by chemical cauterization.

Technique.—The acid is applied to the closed beaks of a pair of College tweezers, which are inserted beneath the operculum and opened (*Fig.* 9.) By capillary attraction the fluid is forced to flow into the pocket and the cauterization process creates a vent for the escape of inflammatory products. Glycerin is painted over the area to neutralize excess acid, and, after quickly removing the rolls, the patient is encouraged to rinse his mouth thoroughly with copious amounts of a bland mouth-wash.

Other caustics for this purpose are liquefied phenol followed by glycerin, or silver nitrate used with eugenol. Silver nitrate is effective applied as a small solid bead fused to the end of a platinum or silver probe or in ammoniacal solution.

Most patients report that chemical cautery stings for a few minutes and then affords great relief. The precise mode of action is unknown, but, probably, it is a combination of the mechanical institution of drainage, sterilization of the pocket contents, and the cauterization of the ulcerated undersurface of the operculum with the destruction of the exposed nerve-endings.

3. The traumatic effect of an impingeing upper molar is corrected either by extraction of the tooth or by grinding down the offending cusps if its retention is important to the articulation.

4. Instruct the patient to take every two hours a salt or sodium bicarbonate mouth-bath (teaspoonful dissolved in a tumblerful of water), as hot as can be tolerated without scalding and held over the affected area for as long as possible. Heat dilates the vascular bed, improving the phagocytic response. This will do one of two things: either hasten fluctuation or cause resolution.

5. For pain, advise an analgesic such as: (*a*) Tabs. Codeine Co.—two tablets, four-hourly; or (*b*) Tabs. Paynocil—one tablet, four-hourly.

6. In the event of a complaint of sleeplessness, a hypnotic is indicated, and a conventional prescription is: (*a*) Tabs. Bubobarbitone (Soneryl) 1½–3 gr. (100–200 mg.); or (*b*) Tabs. Quinalbarbitone (Seconal) 1½–3 gr. (100–200 mg.). Both of these are effective within half an hour of administration. Note, however, that in the presence of pain, barbiturates may cause restlessness and a recommendable alternative is the preparation Sonalgin (May & Baker), which is a soporific and analgesic (dose: two or three tablets with a warm drink half an hour before retiring).

7. The patients are reviewed frequently to confirm progress and to repeat cauterization if necessary. Usually, at the second visit, most cases show considerable improvement.

8. Intra-oral abscesses which are not draining require incision under a general anæsthetic or topical ethyl chloride spray. With a fluctuant area in the buccal sulcus, the

incision should be made just below the reflection of the mucous membrane and parallel with the alveolus. If it is a half to one inch in length it will provide adequate drainage for pus.

Remember, however, that the spread of infection into the floor of the mouth is a contra-indication to the administration of nitrous oxide in the dental chair because of the risk of œdema of the glottis. The patient must be intubated and full precautions taken.

Radiographic examination is rarely essential to confirm the clinical diagnosis of pericoronitis in its early stage. It may be postponed until resolution permits accurate positioning of the film packet and cone, and, then, the dental surgeon can decide whether the tooth should be extracted or put on probation. Sometimes, this decision may be influenced by the condition of the other standing teeth, especially those in the affected quadrant.

In this country, current opinion cautions against the removal of the lower third molar in the acute phase because it is felt that the tooth plays a purely passive role in the causation of pericoronitis. The view held is that the seat of infection is in the pericoronal tissues and that immediate extraction invites an extension of this infective process (possibly virulent) into unprotected "virgin" bone, converting a soft tissue infection into a more serious bony inflammation.

Some American authors, notably Feldman (1941) and Krogh (1951), dissent, and have insisted upon immediate removal of the involved tooth to establish good drainage, claiming that no unfortunate intra-bony sequelæ have occurred.

Other contributors, Kent (1942), Frew (1937), and Miller (1944), feel that such action may be precipitous.

Thoma (1958) admits that it may be necessary to defer extraction until the acute stage has subsided, but contends that with proper treatment and the aid of antibiotics it is possible to remove the tooth much sooner and with greater safety than formerly.

The subject of early extraction may seem controversial, but in practice postponement is a sound policy. Not only is a possible risk of bone infection avoided but the problem of the difficult extraction can be assessed fully. A future appointment for a planned surgical removal is made with the abatement of the acute attack.

Antibiotic therapy and more extensive surgical interference than that described above are never indicated in the treatment of a simple pericoronitis. The complications which call for these facilities and need hospital care are:—

1. Dangerous or extensive swellings;
2. Serious fascial space infections;
3. Toxicity;
4. Severe limitation of opening;
5. The presence of an underlying medical illness, such as diabetes or cardiac disease;
6. Concurrent ulcerative gingivitis.

SUMMARY

The aetiology, pathology, clinical features, and complications of pericoronitis in the lower third molar region are reviewed. Much of the treatment outlined falls within the province of the general dental practitioner, and advice is given upon certain well-tried and effective conservative measures. Reference is made to surgical drainage and antibiotic therapy in the difficult case, and the need stressed for early referral to hospital when complications are suspected.

Acknowledgements.—I wish to express my gratitude to Sir William Kelsey Fry and Professor G. L. Howe, who have stimulated my interest in this well-recognized but ill-understood clinical entity; also to Miss D. Mustart, for her illustrations, and to Mr. A. Finlayson, for taking the photographs.

REFERENCES

Feldman, M. H. (1941), *Exodontia*, 3rd ed. Philadelphia: Lea & Febiger.
Frew, A. L. (1937), *J. Amer. dent. Ass.*, **24**, 440.
Fry, Sir W. K. (1958), personal communication.
Grundy, J. R. (1957), *Brit. dent. J.*, **102**, 100.
Kent, H. A. (1942), *Amer. J. Orthodont.* (Oral Surg. Sect.), **28**, 15.
Krogh, H. W. (1951), *J. oral Surg.*, **9**, 136.
Miller, H. C. (1944), *J. Orthod. Soc.*, **2**, 1.
Salmon, I. (1939), *Dent. Outlook*, **26**, 460.
Thoma, K. H. (1958), *Oral Surgery*, 3rd ed. London: Henry Kimpton.
Tulley, W. J. (1952), *Brit. dent. J.*, **92**, 1.

AN INSTRUMENT FOR MEASURING THE LENGTHS OF ROOT CANALS

By **EDGAR GORDON**, B.D.S., D.D.S.
Registrar, University College Hospital, London

ONE of the most important factors leading to successful root-canal therapy is an exact knowledge of the length of the root canal. Accuracy by means of the normal methods can be difficult at times. Therefore an instrument was designed which would record the length of the canal by direct measurement. This is achieved by passing an electric current by means of the traces of moisture which normally surround the apex of the tooth. This moisture is part of the tissue fluid in the supporting alveolus and completes the electrical circuit which is recorded on an ammeter. *Fig.* 1 shows a cross section of the instrument.

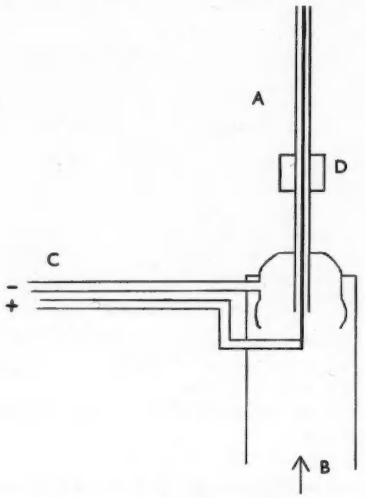

Fig. 1.—Represents a simplified diagram. The instrument is essentially a hollow stainless steel tube (A) through which runs an extremely fine copper wire insulated with varnish. The tube is soldered to a syringe hub which in turn is set into a rubber tube leading to compressed air (B). The fine copper wire comes out through the side of the syringe hub which itself acts as the other lead. The two leads (C) are connected in series to a 4½-volt battery and ammeter. The plastic sleeve (D) on the tube is free to run up and down.

TECHNIQUE

The canal must first be reamed to at least a No. 6 reamer and care must be taken that the sides of the canal are perfectly smooth with no ledges. This is best accomplished with files. The width of the steel tube corresponds to a No. 5 reamer, and it must be perfectly free to run up and down without hindrance. Since the tube is considerably more supple than a reamer it can negotiate any canal that has been so reamed. When sterilization has been completed and the canal is ready to be sealed the instrument is used. The canal is first thoroughly dried with paper points, and the

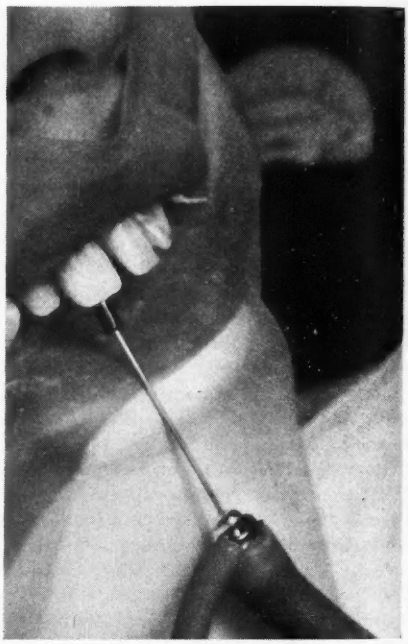

Fig. 2.—Instrument in position. Ammeter shown on right. Plastic sleeve in contact with cingulum.

tube is placed in it and slowly advanced upwards towards the apex while air is passed through. This is shown in *Fig.* 2. At the first contact with the soft tissues at the apex of the tooth a current will be registered. *Fig.* 3 shows radiographically the end of the tube just as it gave a positive contact. At this point the plastic sleeve is slid up to the cingulum, the instrument removed, and the length of the canal measured from the top of the sleeve. The whole procedure only takes a few seconds and there is no sensation as in pulp vitality tests.

Fig. 3.—Radiograph showing instrument in situ.

The compressed air is needed not only to dry the canal but to prevent a continuous positive reading after initial contact. If the instrument is withdrawn a few millimetres after the first reading, a minute film of moisture will remain over the end and give a continuous contact. The air dries this moisture so that the slightest withdrawal will give a negative reading.

The compressed air must be used carefully in only a very gentle stream. It must be sufficient to dry the canal and prevent moisture from collecting at the tip, but not strong enough to prevent contact with the tissue fluids at the apex. On no account should the air be used with the same force as it is in the mouth, or a surgical emphysema will result in the apical tissues. A refinement of the instrument would be to pass the air under water in a bottle somewhere along the rubber tubing leading to the compressed air, so as to control the rate of flow.

The instrument can be sterilized by any of the usual methods with the exception of the molten metal sterilizer, as this will soften and melt the insulating varnish. Occasionally, the end of the instrument has to be sandpapered to freshen the ends of the contact points.

The limitations of this technique are that it can only be used for anterior teeth since the stainless steel tube is too rigid and wide to adapt itself to the curved canals of posterior teeth. Also, in the case of teeth associated with large dental cysts the cysts may be so drained and walled off with connective tissue that there will be no moisture around the apex. However, for the majority of anterior teeth undergoing root-canal therapy this technique will give quick and accurate results.

Effects of Certain Factors on Bacteriæmias resulting from Gingival Resection

One hundred and fourteen samples obtained during gingivectomy produced positive bacterial growth in 24·56 per cent of the cases. Attempts to determine the factors causing these bacteriæmias revealed that tooth mobility and depth of the pocket were not significant. The greater the amount of the surgery the greater was the tendency to produce a positive culture, but this relation was not statistically significant.

The time taken to collect the blood in relation to the start of surgery was also insignificant, though the greater number of positives occurred during the initial phase.

The organism most frequently found was *Streptococcus viridans*, which in antibiotic tests on the 29 organisms showed that all were highly sensitive to chloromycetin, penicillin, erythromycin, and novobiocin.

Histological sections showed nidi of micro-organisms in both the epithelium and the connective tissue of the excised gingivæ.—VARGAS, B., COLLINGS, C. K., POLTER, L., and HABERMAN, S. (1959), *J. Periodont.*, **30**, 196. A. B. WADE

HABIT WITHOUT HARM

In a casual communication given to the Odontochirurgical Society of Scotland on March 13, 1959, Mr. D. Logie described a patient he had seen with a history of thumb-sucking since birth. At the age of 4½ years there was no evidence of malocclusion.

He illustrated his communication with lantern slides.

Fig. 1.—Right thumb showing callus.

Fig. 2.—Sucking position of thumb.

Fig. 3.—Incisor teeth in occlusion.

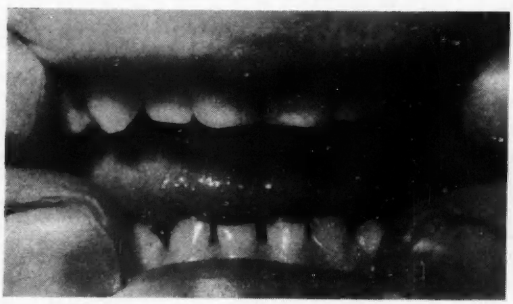

Fig. 4.—Incisor teeth showing no irregularity.

Fig. 5.—Lateral skull X-ray showing jaw relationships.

PREVENTIVE DENTISTRY*

I. DENTAL HEALTH EDUCATION AND ITS IMPACT UPON THE PUBLIC IN THE U.S.A.

By Mrs. L. J. M. KNOX, L.D.S.†
Queen's University, Belfast

DENTAL health education literature is produced in enormous quantities in the U.S.A. The main source is, of course, the American Dental Association. Their catalogue gives details of their 44 publications, and in addition there are 9 exhibits. These are elaborate affairs, and form the nucleus of many dental health education projects. The details of the first exhibit are as follows:—

"Dental Caries. Prevention and Control": This 8-ft. self-contained exhibit has an electrically operated projection apparatus showing 30 slides, stresses tooth-brushing, regular dental examinations, applications of stannous fluoride, and a well-balanced diet. The exhibit weighs 650 lb. and is contained in one crate.

There are also many films, film strips, and slides available for hire, and a list of films and spots which are cleared for television. These spots, lasting 20 seconds each, have titles such as "Tooth-brushing", "Lifetime Teeth", "Sweets and Tooth Decay". These are comparatively inexpensive to produce, and the impact is as great as that of a longer film.

There are also no less than 36 other sources of dental health literature, ranging from the National Apple Institute to the National Dairy Council. The material is excellent, most colourful and attractive, and is all vetted by the American Dental Association prior to publication.

The tooth-paste manufacturers produce some very good leaflets, and these are free. I see no need for a war with tooth-paste manufacturers as we both want the same thing, which is for people to clean their mouths better, oftener, and longer, in which case, they are bound to use more tooth-paste. Finance seems to be the stumbling block in this country, and I think we could achieve a great deal of education of the public with the help of the tooth-paste manufacturers.

The National Dairy Council warrants special mention. Their catalogue gives details of no less than 200 pieces of literature, visual aids, charts, photographs, booklets, and films. The headquarters are in Chicago, there is a regional office in New York, and affiliated Dairy Council units throughout the U.S.A. This organization does a lot of good work in spreading knowledge of a well-balanced diet, and they work mainly through the schools.

The production of good dental health material is not a problem; we have some excellent material in this country, but where the Americans do score is in their enthusiasm in putting the facts over to the American public. Here in Great Britain we are given to understating the case, and do not sound as if we believe, ourselves, in what we are saying. We have a defeatist attitude, which filters through to the public, and they have a sneaking feeling that we do not even practise what we preach.

The individual dentists in the U.S.A. are very active, educating the public in their own surgeries. One dentist gave this account of the routine he uses: A mother rings for an appointment for a first visit for her child. The nurse gives her a suitable time and tells the mother that she will post an appointment card to verify this, and also two booklets to help the mother and child for the initial visit. The appointment card, printed by the American Dental Association for children, strikes a cheerful note with a theme of space travel. The first booklet, *Frank Visits the Dentist*, is a colourful picture book, and the mother is

* From a Symposium on Preventive Dentistry given at the meeting of the British Society of Periodontology held on March 14, 1960.

† Present appointment: Part-time Dental Officer to the Public Health Dept., Birmingham.

asked to play her part by showing the pictures and reading out of it to the child. The second booklet, *Your Child's First Visit to the Dentist*, is packed full of useful advice and information.

A few of the points are:—

1. Make an appointment and keep it.
2. Do not offer a bribe to the child.
3. Let the dentist do the talking.
4. Be prepared to let the child go into the treatment room alone.
5. Speak about the dentist as a friend.

That is a cry from the heart; if only we could start from scratch with children instead of having to undo years of prejudice and misinformation. The Americans really do study their children, we here might say they overdo it, but the parents would honestly try their best to take their child to the dentist in the right frame of mind. By the time the mother and child come to the surgery a lot of spade-work has already been done, and the dentist has already cleared up many points and queries in these two publications.

If the dentist is going to see the child at 10 a.m. the appointment is given for 9.30 a.m. During this half-hour the nurse shows two films in the audio-visual room. "Tooths or Consequences", which tells of the importance of the care of primary teeth, the necessity of early visits to the dentist, and the complications which may result from neglect of these factors. The second film is about a humorous character named Adolphus who presents proper instruction in dental health habits.

Then the child has an inspection, X-ray, and prophylaxis. Two further books are now given: *A B C of Dental Decay* and *Your Child's Teeth*, and a leaflet called *Tooth-brushing*. The next appointment is only for $\frac{1}{4}$ hour when the X-rays are mounted, and an estimate of the cost of treatment is given. On completion of treatment, there is a prize of a toothland A B C, a certificate signed by the dentist, and a metal badge inscribed, "Doctor's award for bravery—professional medal of honour". A similar badge says, "I've had my fillings done, have you?"

Everything possible is done to make visits to the dentist attractive to children, and in the waiting room there are amusing and instructive posters displayed.

The Oral Hygiene Committee of Greater New York is the chief organ through which the dental profession of this city promotes mouth health education of the public. All services are purely voluntary, and the Committee has been in continuous operation since 1920. It is composed of 55 dedicated members of the dental profession and I cannot speak too highly of the work they do. Their slogan is "Prevention through Education".

In June, 1959, the Public Health Association of New York City presented the 1959 Haven Emerson award to the Oral Hygiene Committee of Greater New York. This is a great honour, being the most important public health award in the New York area.

The Committee's major lines of educational endeavour are as follows:—

1. Prepares, publishes, and distributes literature for the promotion of mouth health and the prevention of dental disease and deformity.

2. Trains and assigns speakers to deliver educational talks before children and adult groups.

They realize that getting and holding the attention of the general public requires a different technique from that of speaking to fellow professionals. No matter how well-meaning a speaker may be, an ill-delivered talk does more harm than good.

3. Arranges and supervises radio and television broadcasting programmes and prepares and distributes publicity material therefor.

Since 1928 the Oral Hygiene Committee has organized a radio talk every Tuesday morning, at 10.30 a.m., on WYNC network. These talks last 15 minutes, are non-commercial, and not interrupted. All the members of the general public to whom I talked had heard these programmes at some time or another.

4. Prepares, reviews, and collects dental health material from all sources for audio-visual education.

5. Plans and conducts programmes in public, private, and parochial schools.

Schools frequently organize dental health weeks when films, slides, pamphlets, posters, and all other material available are used in a concerted drive. During this week a member of the speakers' bureau gives a dental health talk and answers questions.

6. Consults and co-operates as an advising group with other bodies in promoting dental health education.

There is a list of 14 associations and groups which work closely with the Oral Hygiene Committee in connexion with dental health.

7. Prepares and conducts dental health education exhibits. While I was in New York there was a large exhibit in a bank in Brooklyn.

8. Plans and conducts High School and Junior High School demonstration programmes. These are specially planned to appeal to teen-age groups.

9. Conducts dental health education classes for teachers so that they can carry on the good work all the year round.

10. Prepares and conducts the programme of the annual "Children's Dental Health Week".

All this activity culminates in the grand climax of "Children's Dental Health Week", which is held during the first week in February. It used to be for only one day but has now grown into one week. Everything that goes on all the year round is stepped up in intensity. Children's Dental Health Week is described as a shot in the arm to the year-round dental health effort. It is said that it is impossible for a New Yorker to be unaware that the first week in February is Dental Health Week. The attractive poster for 1960 has the optimistic slogan, "A Lifetime of Smiles". The three basic rules for dental health are stated. Start a lifetime of smiles by:—

1. Brushing correctly right after eating.

2. Cutting down on sweets, especially between meals.

3. Having your teeth checked regularly.

These posters are displayed in the subways, stations, and every available public place.

The weekly radio talks are stepped up to every day and many dental health films and "spots" are shown on television.

The newspapers co-operate by publishing articles and pictures on dental health.

There is a poster competition organized for children and the winner is awarded National Savings Bonds.

In short, the American public is bombarded from every direction.

These various activities are financed by the 1st and 2nd district dental societies of the State of New York, who vote sums of money to the Oral Hygiene Committee. This is not sufficient, and so the 7000 members of the two parent organizations are individually solicited for funds. The dental dealers and manufacturers also contribute generously, and in this way increase indirectly the sale of their products, while helping to educate the public.

The impact of all this education is considerable. It appears that almost all people in the U.S.A. understand the basic rules of good dental care. If they do not put them into practice it is usually for financial reasons. A neglected mouth is a sign of financial hardship, and therefore a well-cared-for mouth is a prestige factor of the greatest importance.

Here, in this country, we sometimes have a well-educated person, fitted out in impeccable clothes, with a neglected and unsightly mouth. This would not be tolerated in America. Someone would bring pressure to bear, either employer, husband, wife, or children.

Each September in New York State the teachers give each child a dental note. These notes are divided into three parts: normal; under treatment; and completion. These are taken to the private dentist, signed in the appropriate part, and returned to the school. This deals with a large number of children straight away, and the public authorities only have to concern themselves with the children who do not return notes. The dental hygienists inspect those children, interview the parents, and sometimes have to visit the homes. Treatment is given free only if the parents prove they are unable to pay and in most cases the parents pay what they can afford. Those parents who desire treatment sign "request" forms, a subtle difference, where here the parents sign "consent" forms.

One-third of the children of greater New York do not get the treatment they require. This is the average, and in some districts like Central Harlem, two-thirds of the children do not receive the treatment they require; only 53·7 per cent receive complete care. Four per cent are treated by the Guggenheim Clinic, 6·9 per cent by the Public Health Department, and 89 per cent by private dentists. The average child requires 7 fillings in addition to other services, and there is considerable delay in obtaining the treatment due to the long waiting lists. However, once their turn arrives, everything necessary is done for that child before discharge, but after that, the parents are expected to maintain that child's mouth at a private dentist.

The problem we have of parents in this country refusing free dental treatment would cause amazement in the U.S.A. On the other hand, imagine the consternation here if we subjected parents to a means test before giving them free treatment.

Here are some interesting facts regarding attitudes to dental health and reasons for neglect:—

32 per cent neglected their teeth due to parental apathy;
30 per cent neglected their teeth due to financial reasons;
19 per cent neglected their teeth due to lack of knowledge;
9 per cent neglected their teeth due to transportation difficulties;
10 per cent neglected their teeth due to other reasons.

The interesting figure here is 30 per cent due to financial reasons.

These are the reasons given for taking children to the dentist:—

49 per cent went for a routine check;
42 per cent due to pain;
6 per cent due to observed reason;
3 per cent due to the suggestion of someone.

These thoughts were expressed by individuals as to the cause of dental caries:—

28 per cent thought it was due to deficiencies in diet;
23 per cent thought it was due to neglect and improper care;
18 per cent thought it was due to excessive sweets;
9 per cent thought it was due to lack of brushing;
6 per cent thought it was due to soft tooth enamel;
4 per cent had no opinion;
12 per cent thought it was due to other things.

The average figures for U.S.A. are:—

82 per cent of all school children need dental care;
18 per cent have all their care completed;
15 per cent need immediate dental attention.

That means that 64 per cent who require dental treatment are not getting it. Only 27 per cent of 5–12-year-olds have had some care of primary teeth.

The publication *A Motivational Study of Dental Care** is not a statistical study, but 136 people are interviewed and their attitudes to teeth, dentists, and dental care are recorded and interpreted. The people were asked to complete the sentence—"Teeth are . . ." and they said:—

1. Teeth are essential.
2. Teeth have social and personal meanings.
3. Teeth require care.

Then they were asked to complete "The most important thing about teeth is . . ." and they said:—

1. Is brushing them.
2. Is care.
3. Is to keep them clean.
4. Is to keep them in good shape.
5. Is proper diet and prenatal care.

In spite of the vigorous health education programme, the situation is not rosy, but the dental profession can honestly say, "Well, we have left no stone unturned to tell the general public what they ought to do". The motivational study shows that Americans understand very well that teeth need looking after.

The task is more difficult in the United States, where, as well as educating the public, they have to motivate them to spend large sums of money. Here, in this country, the

* Issued by the American Dental Association.

treatment is free and is often refused from appalling ignorance.

I work in an industrial area where the public is particularly ill-informed, and, in my more pessimistic moments, I have likened myself to a missionary in darkest Africa at the turn of the century. There is apathy above as well as below.

The American people is very diet conscious, and here again there is an avalanche of literature. The general literature refers often to the importance of a correct diet in relation to oral health and the public are repeatedly told of the seven basic foods to be eaten every day. They are told to cut down on sweet sticky foods and advised to make their snacks in between meals of fresh fruit and vegetables.

Much education in this respect is done by the Nutrition Bureaux, where trained nutritionists advise the public on any diet problem. They also have a 5-minute broadcast each morning at 8.50 a.m.

One practical demonstration was a most attractive birthday-party table with no sticky carbohydrate food on the menu.

Some public health authorities have organized lacto-bacillus counts, and patients whose counts are over 10,000 per c.c. are put on diets low in sugar and starch until the situation is brought under control.

The time is long overdue for us to enlighten the general public in Great Britain and persuade them that "life-time teeth" are not only desirable but possible.

II. SOME OBSERVATIONS ON THE PERSONAL ORAL HYGIENE OF AMERICAN CITIZENS

By G. A. LAMMIE, Ph.D., M.D.S.

THE MOTIVATION OF GOOD ORAL HYGIENE

PERSONAL mouth care is practised by more people and with more attention in the United States than in this country. It is felt that this is due to the efforts of the upper and middle classes rather than to those of the lower classes. This is borne out by the results of a study carried out on personnel entering the U.S. Navy at Bainbridge, Maryland, between July and December, 1956. Personal questioning of dental officers of all the services amply substantiated the finding that good oral hygiene was significantly correlated with economic and educational status.

In his recently published controversial book, *The Status Seekers*, Vance Packard has divided the classes of the United States into two large divisions, the Diploma Élite and the Supporting Classes; these divisions are further subdivided into strata which we need not consider. There are various characteristics necessary in any individual belonging to the Diploma Élite; important amongst these are financial position and a college education. Those at the top of the Supporting Classes aspire to gain elevation of status and behave in an acceptable way.

It is suggested that good personal oral hygiene is part of the rigid pattern of good manners which characterizes the people of the Diploma Elite. Especially among college men it is expected that the teeth should be cleaned after every meal. Anyone in the fraternity not adhering to this discipline would be noticed, and his omission would not be approved.

Thus the tooth-brushing habit is part of the code of good manners. This code is quite rigid and is described in such books as that written by Emily Post. Good manners in this country are more a matter of tradition and have more flexibility. Whereas different items of personal hygiene find a place in the accepted code of good behaviour in this country, tooth-brushing is unfortunately not one of them.

Whereas young men and women of the Diploma Élite are certainly called upon to attend to personal dental care, it is most likely that they have learned to clean their teeth regularly as children.

The motivation of tooth-brushing in children stems from repetition of the doctrine from

various sources in different ways. In the home the instruction and example of the parents are always present. At school formal instruction is supplemented by the provision of facilities for tooth-brushing. In social groups such as the Boy Scouts, tooth-brushing as a part of personal hygiene is again highlighted. Advertising, and in particular that shown on television, plays its part and requires more detailed consideration.

The aim of any advertiser is to draw the attention of the public to his product and to sell more tooth-paste. This may be accomplished by encouraging someone to start cleaning his teeth regularly or by persuading a regular tooth-brusher to change his brand. It is felt that the advertising of the special merits of particular ingredients is more likely to effect the latter. This form of advertising, when unsubstantiated claims are made, has come in for severe criticism by the American Dental Association. Another kind of television advertising deserves favourable comment, and is one more calculated to induce the enthusiasm of the convert to tooth-brushing. This advertising is aimed particularly at the children; animal and caricature characters play their appropriate roles and tooth-brushing is converted into a game or even an adventure. The appeal of these advertising films is primarily to children, but personal experience would suggest that adults are just as willing viewers.

THE CONFIDENCE IN TECHNIQUE

The American has great confidence in technique. The favourable economic position of his country has, in part, derived from it. It is not surprising, therefore, to find a great confidence in the various techniques of oral care as preventives of oral disease; this confidence is shared by dentist and patient.

It is unfortunate that no data are available indicating precisely what benefit is to be expected from good home care of the teeth in avoiding caries and periodontal disease. It is felt that the American dentist and patient feel that the perfectly cared for mouth will not deteriorate significantly. In this country the confidence of both parties is less.

The dental student in the U.S.A. is taught oral hygiene as a subject and is instructed in methods of teaching his patients. Formal instruction of dental students in oral hygiene is a neglected aspect of training in this country, and a lack of confidence is reflected in Slack's findings in Liverpool, where he questioned dental staff and students on tooth-brushing habits.

It is felt that a great deal is to be gained and little lost from the American approach; whereas some disappointing results will be found, a great deal of good will certainly accrue from careful attention to oral hygiene techniques.

THE PART PLAYED BY THE DENTIST AND THE AMERICAN DENTAL ASSOCIATION IN ORAL HYGIENE INSTRUCTION

The patient attending an American dentist expects to be instructed in oral hygiene technique; this service is considered very worth-while and the patient would expect to have to pay for it. The dentist who failed to meet this obligation would not be highly regarded. The dentist and his hygienist (where one is employed) share responsibility for this. The part played by the hygienist is primarily that of instruction; the dentist helps by checking on deficiencies in technique. In the matter of oral hygiene instruction, the dentist and his staff stand in personal relationship to the patient.

The American Dental Association stands more in relation to the public at large, representing agreed policies on oral care. Its Bureau of Dental Health Education is headed by Perry G. Sandell, a business executive and not a dentist. This is considered a wise choice as the amount of purely dental knowledge involved is indeed small. However, he does require to know business methods, handle public relations, and use advertising, all specialist fields far removed from dentistry.

The Bureau of Dental Health Education lays down official policies of the American Dental Association in general terms. These terms are all generally acceptable. However, the Bureau insists that the application of principles calls for different action in different

parts of the country, and encourages the formulation of dental health programmes at the State or town level. They, however, insist that American Dental Association representatives take part in the planning of such programmes.

The Bureau prepares educational matter, such as pamphlets, films, and television advertisements. It also promotes a National Children's Dental Health Week.

CONCLUSION

Dental health will benefit in this country if both the individual dentist and organized dentistry give more attention to motivating good oral hygiene.

III. FROM KINDERGARTEN TO COLLEGE

By J. RODGERS, D.F.M., L.D.S.
Divisional Dental Officer of Oldbury

THE Public Dental Officer who examines the mouths of all children in his area, whether treated in a Public Health Clinic or privately, is painfully aware of the inadequacy of their dental treatment. The battle against dental caries may seem, at times, to be as futile as an attempt to push back the sea, our small advances being effaced by the next wave. It will be of interest to consider the methods used by our American colleagues to tackle this problem.

I am going to suggest that whilst they have difficulties they have also the knowledge, virility, and power to tackle them, whilst we, who equally have the well-being of our own people at heart, are confounded and dismayed. The teeth of our school children rot at an ever increasing pace, and the ravages due to decay and neglect during the critical years of childhood deny the young adult the birthright of a healthy mouth. This is our great professional challenge, and we must face it. I suggest we fail in the application of first principles because the main reason for our present situation is that Health Education and Prevention have run a bad second to Remedial Treatment, and indeed the British public think almost entirely along the lines of remedy. If we consider the Dental Health Programmes in operation in the great cities of the United States we shall find, in many instances, answers to our problems.

There are 88,000 practising dental surgeons in the United States, and in the year 1957–58 they had 269,000,000 visits from patients, i.e., 1·6 visits per person per year, but in that general statistic are the 0–4-year-olds and the over 65-year-olds with low rates of visiting. The city dweller and the age-groups 15–35 years averaged out at about 2 visits per year. The American Department of Health seems unimpressed by these figures, but there is little doubt that in the matter of Dental Health John Doe compares favourably with John Bull.

Let us start with the small American school child covered by a good community health programme. This is reasonable as 45 States declare health-habit teaching to be an essential part of the school curriculum. One comprehensive statement reads, "Hygiene must be taught everywhere throughout the school course". The small child is taught to brush his teeth correctly simply for the pleasure of having a clean mouth. As the child moves up in grade he is given simple information about his teeth that he can readily understand. When he is further ahead the amount of information is increased, and the results of his instruction evaluated by testing. Instruction is often focused on the individual child. The class teacher, who is the key figure, will bring dental health education into the child's general education. Art classes can, and do, draw posters on diet and dental health. Mathematics classes illustrate by graphs increases and decreases in dental decay, and what child could not do justice to an essay on "Visiting the Dentist"? This relationship between dental health and other subjects in the curriculum provides a beneficial and necessary background and is recommended by educationists.

The teacher, due to her lack of specific training in dentistry, may need help, and whilst this is willingly given by dental societies in general and the American Dental Association in particular, there is also opportunity for learning facts on dental health in the teacher's own training programme. Should the class teacher have no interest in health education the school programme breaks down.

The school children of New York are taught dental hygiene by their class teacher, but the City supplements this instruction by the employment of 150 dental hygienists. These ladies have their own dental offices inside schools. They teach all children that good preventive dentistry starts with prophylaxis, and indeed much of their time is spent carrying out prophylactic treatment, but they concentrate on those children who have had no dental care that year. Over 200,000 of these children were examined by the hygienists and 65,000 of their parents interviewed in the course of a year. Many of the parents were visited at home. This is how New York helps carry out the plan of the health educationists, whose aim is to teach from kindergarten to college.

New York is a vast city, with a mixed population containing many new immigrants. There is much still to be done, because many children have no dental treatment. An analysis of the statistics for the year 1957–58 shows that of the 970,000 children in the city only 53·7 per cent had complete dental care; 12·4 per cent received incomplete treatment, which leaves us 33·9 per cent for whom no dental treatment was reported. The black spots are the less prosperous districts of Red Hook, Mott Haven, and East Harlem where the cost of treatment would be a real deterrent. Free treatment is available for the lowest economic groups only.

It would be wrong to conclude that these results are similar to our own. The Guggenheim Institute, which treated 37,851 children in 1958, inserted 236,416 fillings but extracted only 1500 permanent teeth, and incidentally gave only three general anæsthetics. Another impressive feature in the Guggenheim was the provision of a room where the young patients were taught the correct tooth-brush drill; about 5450 visits were made for this purpose alone. Figures from the Public Health Department confirmed the comparatively small number of permanent extractions. "Always bring your toothbrush", states the Public Health Appointment Card, and this attitude has helped produce figures which show a high degree of appreciation for the basic principles of dental health.

Whilst public health and hospital treatment of children is important, the vast majority of children are cared for by private practitioners. What does the private practitioner do which will not merely restore the child's dental health but will help produce an educated patient and parent by the end of treatment? One pædodontist explained his method: The phone call asking for an appointment provides the first opportunity for establishing a good patient relationship, for the patient is made to feel wanted. A letter is then sent out confirming the appointment, and containing booklets emphasizing the importance of dental health to children. This impresses and instructs the parent and prevents the patient arriving with a negative viewpoint.

When the child attends for the first time and is shown into a well-planned and colourful surgery, the parent is taken aside to a little projection room and shown a film on the consequences which may follow the loss of the 6-year-old-molar. Meanwhile, the child is examined and full-mouth X-rays are taken. On the second visit the X-rays are projected on to a large screen, the cavities outlined, the needs of the patient explained, and the cost estimated. This is salesmanship, but the end-result is a patient who knows what has been done for him. Many of us have met dentists who say of their patients, "If they cannot take my word for it, I would rather not treat them", yet the great improvements we wish for can only come from the willing response of an educated public. The private practitioner does much more than this, for he takes an active part in the planning and carrying out of the community health programme. "No man is an island" is the heading the State of Indiana uses in calling attention to the aid the dentist has given to his community. There is

no clash of interests between public health and private practice. The co-operation between them is close and undoubtedly means improved dental health for millions.

In the United States health propaganda is real. The American Dental Association beams its educational programme on to specific groups like the teenager, and attractive booklets are created with a main theme which emphasizes good looks and the social and business success that goes with sound dental health. Nor is the American adult neglected, for health knowledge is available in a variety of ways, such as articles in newspapers and magazines, lectures, films, and radio. In New York the Oral Hygiene Committee has a weekly programme on the radio for laymen. Talks are given on all branches of dentistry, and the programme, timed for early evening, is available to children.

I have left the most important preventive factor to the end—the use of fluoride. In March, 1959, there were 41 million people in the United States drinking fluoridated water. Many millions more, including the school children of New York, had fluoride topically applied to their teeth. You are aware of the results, they are excellent. How did it come about? I suggest that it came through knowledge. I shall quote the first few lines of an article which appeared in the *American Dental Association Journal* of March, 1956 (David Brock, D.D.S., St. Louis): "Both the public and the dental profession know that 60 per cent of the incidence of dental caries can be prevented amongst children if their drinking water is fluoridated. Both the public and the profession know that among children who do not have access to a fluoridated supply, 40 per cent of the incidence of dental caries can be prevented through topical application."

Our public certainly do not know: perhaps we do not sell our knowledge attractively enough. Philadelphia, which fluoridated its water and combined this measure with the prophylactic odontomy of the 6-year-old molar, recently evaluated the result of its Dental Health Programme. The city's news release is of interest, for it demonstrates the supreme confidence of the City Fathers that dental health is big news. Addressed to all editors it summarizes results and invites them to send photographers, reporters, and tape recorders to the City Hall. In New York, in September, 1959, fluoride was still being topically applied to children's teeth by hygienists, but since my return I learn that New York may soon fluoridate its water-supply. Fluoride has been shown to the American public as one of the essential tools of prevention and a great money-saver as well. Philadelphia's fluoride at 7·5 cents per head per year saves the city a million dollars annually. New Yorkers must have been impressed by the often repeated statement that they had lost 84 million dollars by their failure to adopt fluoridation 10 years previously.

Shortly before leaving New York I visited a large self-service store. All goods were attractively wrapped up, but a cellophane window was cut in every article. The public looked in, was tantalized, and bought. I submit that our American colleagues have cut a window into dentistry.

STUDENT SUBSCRIBERS

Students are reminded that they may become subscribers to the DENTAL PRACTITIONER at half the normal subscription (£1 1s.) provided their order is signed by the Dean of their Faculty.

Further Observations regarding the Effects of Ovariectomy upon the Tissues of the Periodontium

Oöphorectomy on 260 virgin albino mice in the age groups of 4 to 6 weeks and 1 year showed that in the young age group there was retardation of alveolar bone and cementum formation and a reduction in fibre density and cellularity of the periodontal membrane, these changes appearing three months after operation and becoming progressively more pronounced. No similar change was found in the older age group of animals, and there was no evidence of compensatory cellular activity in the adrenal glands.—GLICKMAN, I., and QUINTARELLI, J. (1960), *J. Periodont.*, **31**, 31.

MODERN MEDICINE

EXTRACTS OF PARTICULAR INTEREST TO THE DENTAL PRACTITIONER FROM THE MEDICAL PRESS

Treatment of Constipation

The rational treatment of any disease depends upon a proper understanding of the physiology concerned.

Recent studies have confirmed that the nervous pathway of the peristaltic reflexes is entirely intrinsic, and that it is triggered off by stimulation of pressure receptors in the intestinal mucosa. The nerve impulse is carried by Meissner's plexus to Auerbach's plexus and thence to the muscle-fibres in the wall of the intestine. These two plexuses are sensory and motor respectively.

Another reaction to mechanical stimulation is the secretion of mucus by specialized cells in the colonic mucosa, thereby providing lubrication to the passage of fæces.

Among the commonest physiological causes of constipation are immobilization, dehydration, loss of muscular tone in the elderly, and pregnancy; dietary factors such as fluid intake and roughage, though large additional quantities of the former have no effect upon the consistency of the fæces, and an excess of the latter may even be detrimental.

Among the common drugs that produce constipation are codeine and opiates, as well as the hypotensive agents. Also painful lesions such as hæmorrhoids or fissure in ano. Psychological factors, too, play a great part.

Amongst the preparations for the cure of constipation, the salines act by way of increasing fluid content within the lumen of the bowel, with the resultant stimulation of the small as well as the large intestine. These, however, are not physiological and therefore are unsuitable for regular or prolonged use.

Liquid paraffin has many disadvantages, as it is likely to be detrimental to the absorption of vitamins A, D, and K. Possibly even some absorption of the oil itself may occur, with subsequent deposition in the mesenteric lymph-nodes.

Amongst the irritant purgatives the following are classified: croton oil, castor oil, podophyllin, colocynth, and jalap; these have no place in modern medicine.

Amongst the stimulant laxatives are the anthracin laxatives and phenolphthalein.

The main difficulty with the anthracin group of drugs has been, until recently, the absence of a satisfactory standardized preparation. However, a new fully active preparation of senna (Senokot) in tablet and granule form is now available. A definite dose can be given, thereby providing the means of controlled stimulation of peristalsis in a highly physiological manner.—BURGESS, D. E. (1958), *Pharm. J.*, **181**, 337.

H. MANDIWALL

Parkinson's Disease

Parkinson's disease is a chronic nervous disease characterized by a tremor, muscular weakness and rigidity, and a peculiar gait.

The onset may be abrupt, but usually, however, it is insidious.

The initial symptom is a fine tremor beginning in the hand or foot. This may spread until it involves all the limbs. The disease is one of the most common of the chronic diseases which may afflict mankind.

Despite these unfavourable aspects, Parkinson's disease has the following favourable factors: (1) It does not shorten life. (2) It is not inherited or contagious. (3) It does not cause paralysis or numbness. (4) Vision, hearing, and the mental faculties are not affected. (5) There is no pain in this illness. (6) There are stationary periods of a certain number of years when there is little if any progression in the symptoms. (7) Patients suffering from this disease do not have to be rushed to hospital for blood transfusion or other emergency measures. (8) Many diseases, such as leukæmia, cancer, multiple sclerosis,

etc., are more serious conditions. (9) New remedies for Parkinson's disease are being devised every day, some having considerable success. (10) It tends to protect the patient from cardiac diseases, cancer, tuberculosis, hypertension, and many other illnesses.

This illness affects the basal ganglion, a small centre at the base of the brain, and not the brain itself. Intensive treatment can give the patient many years of productive and comfortable living. If he neglects treatment, however, he may become disabled in a comparatively short time. The patient should perform all activities within his capacity, but not to the point of exhaustion. He should acquire hobbies and special interests within the limits of his physical resources.—DOSHAY, L. J. (1958), *Postgrad. Med.*, **23**, 7.

H. MANDIWALL

Chapped Hands

Soap solutions are a primary irritant of the skin, that is to say, they will damage the skin of any normal person if applied in a sufficient concentration and for a sufficient length of time.

The chapping and soreness of the hands which follow excessive washings is a mild degree of dermatitis which may be partly due to water, but it is chiefly due to the action of soap. Most, if not all, other cleansers have a similar effect.

The only real answer to this question is, therefore, that the frequency and duration of washing should be reduced when these symptoms appear. If this is not practicable, several remedies may be sought.

First, a trial may be made of different soaps and soapless cleansers. Secondly, exposure of the hands in domestic work can be cut down by provision of a washing machine and similar devices. Thirdly, the use of rubber gloves may be helpful, particularly if a cotton glove is worn inside. It is, of course, a general experience that if the rubber gloves are worn for substantial periods, the skin beneath becomes macerated and may suffer accordingly. Fourth, barrier creams are often recommended, but the protection they afford is doubtful. Water-resistant barrier cream usually consists of oils and/or silicones. They form a layer which soap and water does not penetrate.

A layer of lanoline applied to the skin before doing wet jobs is probably just as effective.

Finally, the application of grease and glycerin to the skin after washing will help to counteract the effects of soap and water.—"Any Questions?" (1960), *Brit. med. J.*, **1**, 363.

H. MANDIWALL

The Treatment of Nausea and Vomiting in Pregnancy

One of the most unpleasant features that women experience during the various stages of pregnancy is nausea and vomiting.

There appears to be no proven reason for this, though it has been suggested that it may be neurogenic, endocrinal, metabolic, or psychogenic in origin. Many remedies are suggested, but despite them all, women continue to suffer instead of enjoying a normal physiological event. Recently a preparation in capsule form, known as Nedoxital, was devised containing:—

Pyridoxine hydrochloride B.P.C.	50 mg.
Nicotinamide B.P.	25 mg.
Benzocaine B.P.	100 mg.
Pentobarbitone sodium B.P.	15 mg.

These capsules taken by mouth have resulted in the symptoms being permanently relieved within one week in 87 per cent of cases. Treatment consisted of administering one capsule 30 to 45 minutes before a light meal, 4 times a day for about 10 days.

Occasionally it was found necessary to commence a second or third course of capsules, but this was in only 12 per cent of cases. The ease of administration and lack of side-effects together with their relatively low cost make this treatment invaluable to expectant mothers.—TAYLOR, F. (1959), *Practitioner*, **182**, 610.

D. DERRICK

BACK NUMBERS

The Publishers would be glad to purchase copies in good condition of Vol. IX, No. 2, October, 1958.

BOOK REVIEWS

ORTHODONTIC NOTES. By D. P. WALTHER, M.R.C.S., L.R.C.P., L.D.S. R.C.S. (Eng.), D.Orth. R.C.S.; Reader in Orthodontics, University of London; Director and Head of the Orthodontic Department, The Royal Dental Hospital of London, School of Dental Surgery, University of London; Honorary Consultant in Orthodontics to the Hospital for Sick Children, Great Ormond Street, and to the St. George's Hospital Group. $7\frac{1}{4} \times 4\frac{3}{4}$ in. Pp. 212, with 77 illustrations. 1960. Bristol: John Wright & Sons Ltd. 20s.

THE first edition of a book is the result of a lot of hard work over a long period of time. This should be appreciated by anyone who reads it, particularly a reviewer, who should not accept the task of reviewing light-heartedly, but should seriously discuss it objectively and criticize constructively. The reviewer has endeavoured to follow these principles in the present review.

Orthodontics to-day is a most important branch of dental science with a broad foundation and it thinks, researches, and teaches physiology of the organ as well as growth development. In compressing such a difficult and complicated subject into 185 pages of text there is a very great danger of over-simplification. This is the greatest criticism of this book; in addition, it probably over-emphasizes the applied aspect of the subject, i.e., treatment.

The teacher's duty is to produce dental surgeons who will maintain a high standard of clinical dentistry, which can only be achieved if the student is encouraged to keep an open mind, observe, reason, and continue to learn, otherwise he becomes a mere technician. If his reading is too narrow and his teaching too dogmatic, such an attitude to his profession is not encouraged. The fact that some undergraduates may not be capable, or in a position to think for themselves and be critical, does not invalidate the argument or reduce the teacher's responsibility. To say, "It is now widely accepted" is no alternative to a discussion. It must be remembered that Angle's ideas were at one time "widely accepted", that is, by those who said most, most often, and Case's were not. To-day, orthodontic thought is more in harmony with Case's concepts than Angle's and that which is "widely accepted" to-day may to-morrow be unacceptable. The absence of a bibliography would seem to infer that no further reading is necessary, but the reviewer, in fact, knows that this is not the author's opinion.

In places there seems to be some confusion of thought. For instance: "Increased function does not give rise to increased growth. No amount of exercise induces bones to grow beyond their genetically determined limits, but normal function is necessary to reach these limits." Function, therefore, does not influence growth, but the lack of it does. One might ask, in cases where growth has been affected adversely by the lack of function, would the restoration of function not affect the growth favourably? Are dental base relationships immune from this influence?

Some hold the view that orthodontics is a postgraduate subject, but whether one agrees with this or not there is little doubt that orthodontics for cleft palate patients is certainly a subject for postgraduate study, yet in this book it is dealt with in comparative detail covering 13 pages which could quite easily be reduced by half. Logan bow, Le Mesurier operation, and Wardill's operation are mentioned but not described, and could well be omitted from a text-book for undergraduates, the broad principles only being given. On the other hand, there is nothing on the theory of springs, which is fundamental in treatments, or about electric spot welding or soldering, which will certainly be required in making some of the appliances so well described in the later chapters.

Another omission, although smaller, yet of some importance, is the failure to mention in favour of the head and chin strap in treatment of Class III occlusion that it is a very simple

treatment possible at an early age and before cephalometric X-rays are usually practicable.

The paper is of good quality and the print is sharp and easily read. Fig. 29 could easily be moved to p. 67 opposite the appropriate text, and the lay-out on pages 103, 107, and 168, where there are two lines of text above and two below the illustrations, could be improved if the four lines were put above the illustrations as on p. 133.

Its convenient size should make it popular with the student able to study at odd times, e.g., on bus or train. The paper back is strong enough to withstand a fair amount of use and probably helps in keeping the price very reasonable at 20s. It remains an excellent book, provided it is realized that the author intended it as a "basis around which both undergraduate and postgraduate can read and develop this subject" and not as a standard text-book. It can also be recommended for revision following a set course of lectures and a clinical course.

H. E. W.

FIXED PARTIAL PROSTHESIS. By Joseph E. Ewing, D.D.S., F.A.C.D., Professor of Crown and Bridge Prosthesis, Temple University School of Dentistry, Philadelphia. Second Edition. 10×7 in. Pp. 288, with 261 illustrations. 1959. Philadelphia: Lea & Febiger (London: Henry Kimpton). 63s.

Although this is the second edition of this book, it still gives the impression of being rushed through the printing press. The volume fails to prove that a good text-book may be written in note form with long enumerated lists of operating stages. The book has, however, plenty of sound practical advice on all aspects of crown and bridge work and gives both the operative and mechanical techniques in great detail, stage by stage. The material has been brought up to date and now includes chapters on high-speeds, the newer impression materials, and the baking of porcelain on to gold. The student and practitioner will undoubtedly find it useful, although some of the opinions expressed make strange reading. The illustrations are, to say the least, of poor quality and the type of printing makes it somewhat difficult to read, and the whole book gives a sense of being full to overflowing. It is understood that this book is widely used and it is hoped that in the next edition it will be improved even more.

N. L. W.

BASIC PERIODONTOLOGY. By A. Bryan Wade, B.Ch.D., F.D.S. R.C.S., Director, Department of Periodontology, Royal Dental Hospital of London School of Dental Surgery, University of London. $8\frac{3}{4}\times5\frac{1}{2}$ in. Pp. 303+xii, with 223 illustrations. 1960. Bristol: John Wright & Sons Ltd. 50s.

There is a need for a British text-book to explain present-day concepts in periodontology, since more emphasis is being placed on the teaching of this subject in dental schools, both at an undergraduate and postgraduate level. This need has been adequately accommodated by the book under review. The author has divided his book into four sections: Introductory; Health; Disease; and Prevention.

The introductory section deals with the objectives and aims of dentistry and it is pleasing to find the author advocating the need for function of the dental apparatus as one of the basic objectives in the prevention of dental disease.

A section on health of the periodontium follows, and in this the development and biology of the tissues are clearly explained. I would have welcomed a bibliography throughout the book, but particularly so in this section where there is reference to the physiology and biochemistry of the tissues.

The main part of the book is found under the section on disease. Here aetiology, pathology, diagnosis, and treatment are discussed. The author presents a composite part on the pathology of the tissues starting with chronic marginal gingivitis and its pathogenesis and leading up to the tumours that may affect the periodontium. Occlusal analysis, using an anatomical articulator, is an essential diagnostic aid in periodontology and its indications and methods of use are very well illustrated. Treatment is based on good diagnosis and the author, having shown

diagnostic methods, deals fully with all modern methods of periodontal treatment.

The final section concerns itself with prevention of disease. It discusses tooth-brushing and other adjunct therapy and mentions the natural cleaning mechanisms through a functional dental apparatus. One cannot help feeling that "prevention" should precede the disease itself and that it might well be combined with the introductory section to place it thus, in its true perspective.

This is an excellent book, beautifully illustrated, and the author is to be complimented on the standard of his photographs which provide for an easy understanding of the text throughout. For the undergraduate and postgraduate dental student this book will be of tremendous benefit. The general practitioner in reading it cannot fail to be aroused from the apathy with which he regards periodontal disease.

G. S. B.

BONE HOMOGRAFTS IN THE SURGICAL TREATMENT OF CYSTS OF THE JAWS AND PERIODONTAL POCKETS. A Clinical and Experimental Study from the Institute for Experimental Medical Research, University of Oslo. By HEYMAN KRØMER. $8\frac{7}{8} \times 6\frac{1}{8}$ in. Pp. 121+62 pages of plates. 1960. Oslo: Oslo University Press. Norw. Kr. 45.

THE results of clinical studies carried out in the author's private clinic since 1952 are reported, together with experiments on dogs, performed at the Institute for Experimental Medical Research at the University of Oslo.

The thesis is divided into three parts, the first being concerned with the use of bone implants in the treatment of periapical, fissural, residual, and follicular cysts, and ridge defects.

Part II deals with operative treatment of periodontal pockets in humans with bone grafts; and the final section reports experimental work on the dogs.

In the introduction there is a well-reasoned discussion on the problems of bone-grafting in general, and the plan of the reported investigations is outlined. The reasons advanced for the investigations are the fact that conventional methods of surgical treatment of medium-sized and large cysts of the jaws and of infrabony pockets are considered by the author to have been unsatisfactory.

In Part I it is reported that bone-grafting was carried out in 40 males and 30 females who were observed for periods varying from one to six years. Bone was obtained from ribs removed in heart operations, resected femoral heads, and iliac crests; being in all cases preserved in an aqueous solution of methiolate 1 : 1000.

The criterion for success was a complete restitution to health, and 51 of the 70 cases were considered to fulfil the criterion laid down; 14 were regarded as partly favourable, and 5 as failures. The author considers these results satisfactory.

In the second section, bone obtained from the same sources was used in the treatment of infrabony pockets, and again good results are reported. It is concluded that such grafts are resistant to infection and well tolerated by the host.

A method of reducing pockets in dogs is reported and evidence is produced to show that these pockets were not completely lined by epithelium after 56 days, though at 91 days the process was complete. In experimental work of this nature a period of 90 days should be allowed to elapse.

Absolute sterility of the bone-graft and the host bed did not seem to be a necessary requirement for success.

Histological evidence is produced showing an organic connexion to the denuded root surface.

This is one of the highly specialized monographs which originate from the Scandinavian countries and can be strongly recommended to anyone specializing in periodontology. For those who are not interested in the particular theme of this work it will act as an excellent example of the basic method required in any research undertaken, and as two-thirds of the work were carried out in private practice, it should serve as an inspiration to all those who find themselves in danger of becoming bored by the monotony of general practice.

A. B. W.

ABSTRACTS FROM OTHER JOURNALS

American Techniques in Endodontia

A modified Grossman technique under six headings. The example is an upper central tooth.

1. *Instruments and Drugs.*—Long-handled reamers and files for upper anteriors, Kerr Style D; shorter ones, Kerr Style B for other teeth. Luer-lok 2–3 c.c. syringes for the two irrigation solutions. Gutta percha points for upper anteriors, silver for other ones; all one inch or more in length. Former stored in metaphen and sterilized in alcohol before use, latter heat sterilized. Molten metal sterilizer can be adapted for use of table salt, and when heated to 450° F. reamers and cotton-wool, etc., are dipped into the salt for 5–10 seconds. A warmed carpule of local anæsthetic is recommended as an isotonic irrigation solution for vital teeth. It will not rupture the R.B.C. and so help to eliminate tooth-staining. For non-vital teeth double-strength chlorinated soda solution (U.S.P.) and 6 per cent hydrogen peroxide are used. Of the medicaments, antibiotics are used only in intractable cases, and instead use is made of chlorphenol-camphor-menthol. The root-canal filling paste should be one which does not stain the tooth.

2. *Preparation of Tooth for Treatment.*—Radiograph; grind out of occlusion; fill cavities and make a new opening in cingulum and directly over the canal.

3. *Treatment for Vital Teeth.*—(Never fill a canal immediately following extirpation because pressure built up by exudate following amputation may cause pain and the hæmorrhage which may occur when the local anæsthetic wears off may interfere with sealing of root filling and also cause staining.) If the pulp is inflamed allow it to recover before extirpation; remove irritants such as caries and fillings, irrigate with warm water, and place a dentalone dressing in the cavity or over the exposed pulp and seal. At the end of four days, and at the first appointment proper, the tooth is prepared as described above and the length of the tooth on the film recorded on the treatment card. The pulp is removed after engaging with a barbed broach through one half-turn; irrigate with the warmed anæsthetic solution; insert a No. 1 reamer into the canal until the rubber dam marker on it touches the incisal tip of the tooth (the position of the marker on the reamer is obtained from the tooth-length on the record card). Reamers of increasing size are given half-turns forwards and backwards, and irrigation is continued until hæmorrhage stops, 1–100 adrenaline is used sparingly if required, and a truncated paper point dipped in eugenol is placed and the cavity sealed. At the next visit if all is well a root filling 1 mm. short of the apex is placed; this is to allow the periodontal membrane help seal the apex.

4. *Treatment for Non-vital Teeth.*—(If an acute alveolar abscess is present the opening made is left patent for a week and hot mouthwashes and antibiotics, if necessary, are prescribed. The tooth must be symptomless before treatment is commenced.) At the first appointment proper no instrumentation is attempted. The canal is irrigated with chlorinated soda, dried, and a dressing of camphorated chlorphenol is sealed with G.P. At the second appointment irrigation is continued with the two solutions, beginning and ending with the chlorinated soda, and when the flushings, caught on cotton-wool rolls, are seen to be stain-free a medicated dressing is placed and sealed. Five such appointments may be required; P.B.S.C. can reduce this number and culturing is the only real means of ensuring that the canal is ready for filling.

5. *Root-canal Filling.*—The aim is to seal hermetically the canal apically and laterally. A G.P. cone of suitable width is selected and cut at the blunt end to the length marked on the record card. It is put into the canal until it binds apically, when the cut end should be level with the incisal edge of the tooth. If it passes too far or binds too soon a more suitable cone is selected. The canal is now dried and painted with small quantities of the creamy canal sealer by means of a smooth broach. The dried cone is rolled in the sealer

and pushed home. All traces of sealer must be wiped from the crown part of the canal with chloroform to obviate staining, and for the same reason the tooth restoration should be silicate rather than amalgam.

6. *Root Resection.*—Not now used extensively and it is found that large granulomatous areas resolve if the canal therapy has been carried out thoroughly. Periapical curettage is more popular and at the same time the root apex is freshened with a bur. Resection will be required for cystic areas, incomplete root fillings, and curved roots.—MAYNE, J. B. (1959), *Aust. dent. J.*, **4**, 250.

G. E. B. MOORE

Reactions to Local Anæsthetics

Adverse reactions to local anæsthetics may be local or general, and the former can affect the operator.

Local Reactions.—A delayed type contact allergic sensitivity, less seen nowadays when procaine is not so widely used, manifests itself as a chronic, scaly, itching rash on the hands of dentists after frequent contact with these solutions. A similar lesion may occur within the tissues where the solution has been placed, and this appears as a large indurated swelling 8–24 hr. later. This occurs after each subsequent injection and the reaction becomes progressively worse. "Patch" or intradermal tests may be used for local anæsthetics.

General Reactions.—These are more important and more frequently occurring than local ones and can be fatal. There are four types of reaction excluding the less common ones such as heart attacks and strokes.

In diagnosing the type of reaction a blood-pressure cuff is required together with consideration of the following clinical phenomena: level of consciousness, tremors, perspiration, respiration, blood-pressure, nausea, appearance and colour of skin, and appearance of tongue and lips.

1. *The Nervous Faint.*—Commonest reaction and nothing to do with the pharmacology of the solution. It is due to the sudden pooling of the blood to the lower parts of the body. There may be nausea, sweating, normal respirations, slow pulse, and lowered blood-pressure. Consciousness will be lost in 2–3 min. if the patient remains upright and Nature will attempt her own cure when the patient slumps to the floor. Put the head lower than the feet immediately; the brain can tolerate only 2 minutes' anoxia.

2. *Toxic Overdosage.*—Next in frequency arising 4–10 min. after injection and the effect on the central nervous system may be mild or maximal stimulation or depression. The reaction is to be looked for during injection, and if a restless patient suddenly becomes manageable a sense of false security is to be avoided. The face may be pale or cyanotic, rapid respirations may slow, a rapid pulse become imperceptible, and the blood-pressure fall to nothing. Short-acting barbiturates are the immediate requirement of treatment followed by artificial respiration and intravenous saline, and if recovery is not apparent the patient must be taken to hospital.

3. *Epinephrine Overdose.*—This reaction from the amount of epinephrine used in dentistry is rare. The face is dead-white but dry (cf. faint), there is a pounding heart and the blood-pressure rises. Recovery occurs in 5–10 min., and no treatment is required beyond reassurance.

4. *Anaphylactic Reaction.*—A rare type which comes on 2 min. to 2 hr. after injection. The tongue feels large and the chest tight; the breathing may be difficult and wheezy. Itching of the lips and spreading to the rest of the body is an early symptom. The face becomes red (cf. other three types) and the pulse and blood-pressure are normal. Epinephrine is used in the treatment, 0·4 c.c. of aqueous solution 1–1000 subcutaneously, to be repeated every 5–10 min. up to 4–5 doses. Later anti-histamines may be used, chlor-tripolon 5–10 mg. subcutaneously. The patient must be upright, and if the attack is uncontrollable in 15–25 min. after the epinephrine, death is likely to occur and oxygen must be given. These cases are usually sent to hospital for 24 hr. observation.—TOOGOOD, J. H. (1960), *J. Canad. dent. Ass.*, **26**, 194.

G. E. B. MOORE

SUBMERGED FIRST PERMANENT MOLARS

By **M. L. BRENCHLEY**, B.D.S. (Lond.), L.D.S. R.C.S. (Eng.)
Dental Department for Children, Guy's Hospital

CASE REPORT

J. B., a girl aged 11 years, was referred to hospital in September, 1958, because of the presence of three submerged first permanent molars $\left(\frac{6|}{|6}\right)$.

CLINICAL FEATURES.—On examination two depressions were seen in the right first permanent molar regions, at the bottom of which hard structures could be felt with a probe. The upper left second deciduous molar was partly submerged. The tip of the crown of a tooth was visible in the lower left second permanent molar region (*Fig.* 1).

On radiographic examination, the full complement of teeth in the developmental stage expected at the age of

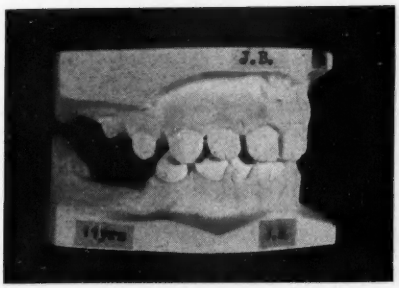

Fig. 1.—Models to show state of the dentition at 11 years. *Note* depression in $\frac{6|}{|6}$ region and submerged $\underline{|E}$.

A B

Fig. 2.—Pre-operative X-rays. Right and left sides.

A communication given at the meeting held on March 14, 1960.

11 years was demonstrated. The lower first permanent molars were present in an upright position with the occlusal surfaces of their crowns on a level with the superior surface of the alveolar process and their apices with the inferior border of the mandible. The upper right first permanent molar was present with its crown on the same horizontal level as the upper right second permanent molar. Occlusal fillings were present in the right first permanent molars (*Fig.* 2).

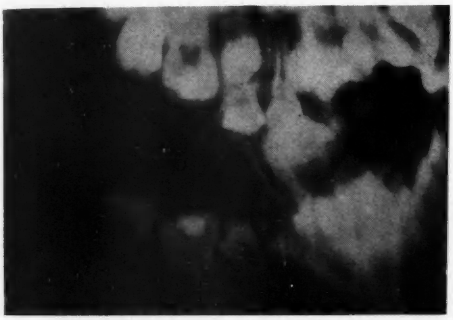

Fig. 3.—Previous X-ray, 1956. Right side.

Fig. 4.—Post-operative X-ray of right side.

HISTORY.—It is known that the lower right first permanent molar erupted between November, 1954, and March, 1955, and was filled in April, 1955, and again in December, 1956. The upper right first permanent molar was filled in March, 1955, and again in November, 1956, when a note was made that it was beginning to submerge. It can be seen from the X-ray taken in December, 1956, that the right first permanent molars were then only just visible in the mouth (*Fig.* 3).

TREATMENT.—Surgical removal of the three submerged first permanent molars and the upper left second deciduous molar was advocated. This decision was made due to the possibility of caries attacking the submerged teeth, two definitely being open to the mouth and the other possibly by an undetected sinus. The consequent pulpitis and possible abscess formation would precipitate a difficult extraction as an emergency (Glass, 1951). At a later date surgery would be more difficult and there would be less chance of the remaining dentition adjusting itself (with or without the aid of orthodontic treatment).

The right first permanent molars were removed surgically under general anæsthetic, and this necessitated the extraction of the lower right second premolar. There were no signs of ankylosis of the roots, and the healing was uneventful (*Figs.* 4, 5). The lower left first permanent molar and the upper left second deciduous molar were removed at a later date. There was no loss of sensation in the lower lip.

EXPLANATION OF CONDITION

From the fact that the apices of the lower right first permanent molar are so near the lower border of the mandible, it must be assumed that the right first permanent molars began to erupt but never came into occlusion. Instead, they lost the ability to complete eruption but remained visible in the mouth for some 2 years until the alveolar process developed around the "inert" teeth. From a diagram showing a tracing of a radiograph of a normal dentition at $5\frac{1}{2}$ years, it can be seen that if the tooth suddenly became inert and ceased to rise occlusally, continued root development would result in the apices being in close relationship to the lower border (*Fig.* 8).

Fig. 5.—$\frac{6|}{6|}$ surgically removed.

It is interesting to note the degree of distal tilting of the lower right second premolar

which had not erupted. It would appear in the X-ray of December, 1956 (*Fig.* 3), that there is a small fragment (probably of lower right second deciduous molar) in contact with

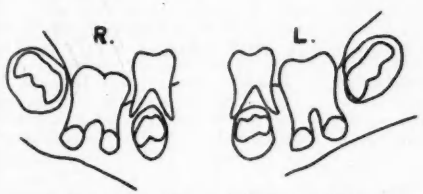

Fig. 6.—Tracing of a X-ray of the "normal" position of $\overline{6|6}$ in a child aged $5\frac{1}{2}$ years.

the mesial surface of the lower right second premolar crown. In the recent X-rays this fragment can still be seen but is now surrounded by alveolar bone (*Figs.* 2 A, 4). It would appear that the lower right second premolar may have become impacted between the lower right first permanent molar and the fragment.

Such examples of arrest of occlusal rise of teeth offer an interesting dated measure of alveolar development (*Figs.* 2 A, 3). It is also interesting to note that the apices of the lower first permanent molars are hooked (*Fig.* 5). It would appear that though the teeth presumably became "inert" when close to the lower border of the mandible, the roots continued to develop and did so in a distorted manner on reaching the cortical layer of bone at the lower border of the mandible.

CONCLUSION

It would appear that this condition is of local cause and can be independent of the actual degree of eruption of the tooth concerned since it may commence at varying stages of eruption (Visick, 1944).

This lack of "erupting-power" may be due to ankylosis of the roots of the tooth, as it is believed to occur in deciduous teeth that submerge (but no evidence of ankylosis of these three first permanent molars was present in this case), or to a similar defect to that which is found in such rare conditions as cleidocranial dysostosis, only to a localized degree.

Finally the causative factor may conceivably be of phasic nature, but the resulting "secondary-impaction" by tilting adjacent teeth, augmented by the distorted nature of the apices, would tend to maintain the condition. Such a possibility was described by Dixon, 1959. The first permanent molar becomes impacted against the second deciduous molar, and fails to erupt when the deciduous tooth is shed, allowing the second premolar and second permanent molar to erupt past it, and to reimpact it.

Acknowledgements.—I would like to extend my thanks to Mr. W. J. Tulley and Mr. B. E. Cooke for their help and advice, and to Mr. K. E. Pringle and Mr. A. E. Croke for permission to use this material, and to the photographic department at Guy's Hospital for preparing the photographs and slides.

REFERENCES

Dixon, D. A. (1959), *Brit. dent. J.*, **106**, 8.
Glass, D. F. (1951), *Dent. Rec.*, **71**, 74.
Visick, H. C. (1944), *Trans. Brit. Soc. Orthodont.*, 67.

DISCUSSION

The President thanked Mr. Brenchley for a most interesting paper. He said that this was a very obscure subject and he was sure there were many members who would like to discuss the paper. He could remember one case which had a very strong family history on the mother's side, and there again, whatever one did, there was no result; but it affected not only the sixes but also the sevens on one side. It had been said that if they were loosened slightly, they might erupt, but he thought that had been tried, with no success at all.

Mr. H. E. Wilson said that he could report a similar occurrence in a family of two children, a boy 8 or 9 years old and a girl 12 or 13 years old, who had both deciduous and permanent molars ankylosed. The mother had an impacted first permanent molar removed a few years earlier. The X-ray of this showed a typical ankylosed first molar. One child had treatment on one side to bring the molars into occlusion, but this was unsuccessful. Treatment was discontinued, but the patients are kept under observation and the time approaches when they probably will have their first permanent molars extracted, which appears to be the only treatment. He had nothing else to add, the aetiology of ankylosis in the permanent dentition being a closed book to him.

Mr. D. F. Glass wished to thank Mr. Brenchley for a very interesting communication, which included some very good illustrations of submerged teeth.

He agreed with Mr. Brenchley that there was no association between this type of submerged tooth and that found in cleidocranial dysostosis. In cleidocranial

dysostosis the teeth were unerupted and had never been in contact with the oral cavity, whereas in all the submerged teeth seen by Mr. Glass there had been contact with the mouth and caries in some of the teeth.

He thought that with cleidocranial dysostosis the unerupted teeth should not be removed unless they were causing pain, whereas the true submerged tooth should always be removed, as the connexion with the oral cavity caused infection to the tooth and the area surrounding the tooth.

Mr. Huddart thanked the speaker for a very interesting observation on a rather obscure subject. He himself had had one of these cases some years ago. This was a distally inclined $\overline{6}|$ which was impacted against the mesial aspect of a mesially inclined $\overline{7}|$. The $\overline{6}|$ was almost completely covered with mucosa except for the mesial surface which was facing upwards and forwards and was exposed to the mouth. Fortunately the $\overline{5}|$ was rather hypoplastic so this tooth could be taken out with a clear conscience. The $\overline{6}|$ was exposed as much as possible by cutting away the overlying mucosa and then a mesial Class II gold inlay was constructed in the tooth. This inlay had a hook on its mesial aspect and elastic traction was used to pull the first permanent molar from underneath $\overline{7}|$. In this way the tooth was uprighted and practically brought into occlusion, but at that stage Mr. Huddart said he left the department where he was treating the case and that was the last he saw of it. He thought it might be interesting to know that there was hope for some of these cases.

Mr. D. T. Hartley said he could finish Mr. Huddart's story. The lower molar had, unfortunately, failed to reach occlusion. They had considered placing an onlay to bring it into functional contact with the opposing teeth, but eventually decided against this. He thought that the orthodontic movement achieved had been essentially an uprighting of the molar, which originally had a severe distal inclination. In comparison with this any vertical movement was probably quite small.

Mr. Brenchley said that he had been interested to hear what everyone had said; that these teeth, since they began to erupt, and did not completely erupt, were more prone to caries than teeth that had never come through. As far as moving them was concerned, he had read of cases where it had been attempted without success.

The Air-driven Handpiece for Children

This is a report of a study undertaken to test the suitability of the air-turbine for children.

Method.—The children, aged 3–7 years, were examined and those with comparable quadrants requiring treatment were chosen and charted. Records were kept on type of handpiece used (air-driven or conventional), patient reaction, sensation, stated preference, and on cavity details. The treatment was routine; local anæsthetic "to put the tooth to sleep", a rubber mouth-prop to use as a "chair to rest the tooth on", and rubber dam used as "a raincoat to keep the tooth dry". Neither premedication nor sedation was used.

Results.—No attempt was made to assess pain incidence when anæsthesia was not used. Eighty-three per cent of the children preferred the airotor to the conventional handpiece, because there was no vibration or noise on the tooth. Those who voted against the airotor did so because of whine. All the children appeared to be more relaxed during airotor treatment than during treatment with a belt-driven handpiece.

Cavity preparation was carried out using air coolant only; this was augmented by air from a syringe operated by an assistant. Although many studies have shown that temperature rise in cavity work is markedly reduced by the use of water coolant, the methods used here gave satisfactory results as far as clinical observations could show. That no thermal injury was inflicted on the pulp was further substantiated by observations on other patients treated under similar conditions in the same clinic and by questioning practitioners who used the same methods. Cavity preparation time in quadrant dentistry for children is reduced by about one-third, but other details of treatment are not reduced in time and the final findings regarding time may not be very different from those obtaining when conventional rotary speeds are used because the operator may feel he can justifiably spend more time on other details of the restoration.

The operator's reaction was one of ease of operating. Since the tactile sense is largely lost when operating with the airotor, good and constant vision must always be available; isolation of the tooth with rubber dam conduces to this.

The airotor handpiece was shown to be economical to use; both it and the carbide burs stood up to the work well and no maintenance incurring any cost was necessary during the thirteen months which the study occupied.—Yeo, D. J. (1960), *Canad. dent. Ass. J.*, **26**, 467.

G. E. B. Moore

SERIAL MODELS ILLUSTRATING SOME SPONTANEOUS CHANGES IN THE DECIDUOUS DENTITION

By **B. C. LEIGHTON**, L.D.S., D.Orth. R.C.S., H.D.D., D.D.O.
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ALTHOUGH much has been written in support of the thesis that the pattern of development of the masticatory apparatus is determined at an early age, this is by no means the case when occlusion, one of the manifestations of this development, is studied. A certain degree of flexibility is permitted in the early stages by adjustments to the path of closure of the mandible and by migration of individual teeth within the alveolar processes.

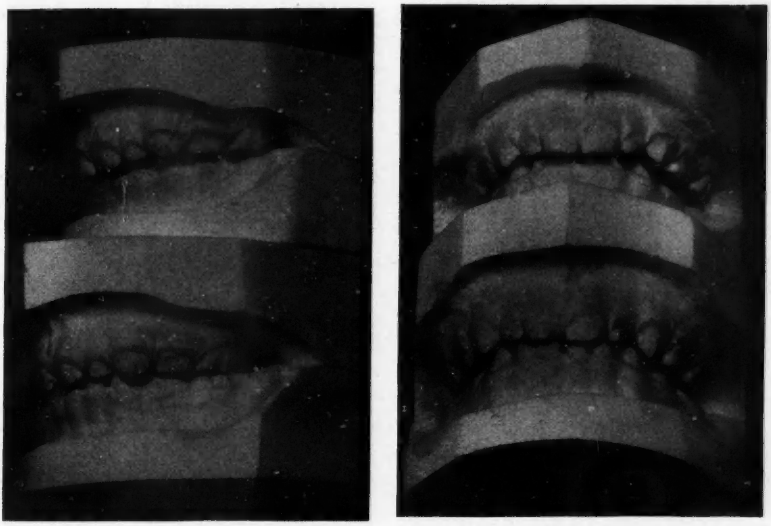

Fig. 1.—*Case* 271 in which postnormality and buccal occlusion of the deciduous molars of the left side improved spontaneously. Models taken at $2\frac{1}{2}$ and $3\frac{1}{2}$ years.

In 1908 Chapman reported his observation that although the distal surfaces of the upper and lower second deciduous molars were frequently in the same vertical plane before the age of 3 years, this relationship may be improved by forward movement of the lower molars relative to their opponents by 6 years. The change was said to be associated with a greater increase of upper arch width and a decrease of the incisor overbite, which was considered by Friel to be necessary to facilitate this movement. More recently Bonnar (1956), in a serial study of 60 children, found that in some cases spontaneous improvement of a postnormal occlusion may occur either at the time of eruption of the second deciduous molars, the first permanent molars, or the permanent incisors. No mention has been made, however, of cases showing other changes of arch relationship.

In a series of 212 cases it was found that deterioration of occlusion occurred as

A demonstration given at the meeting held on May 9, 1960.

frequently as did improvement (*see Table I* and *Figs.* 1–3). Forty cases exhibited some alteration of occlusion between the third and fourth year. The incidence of changes which may be equally for better or worse suggests that

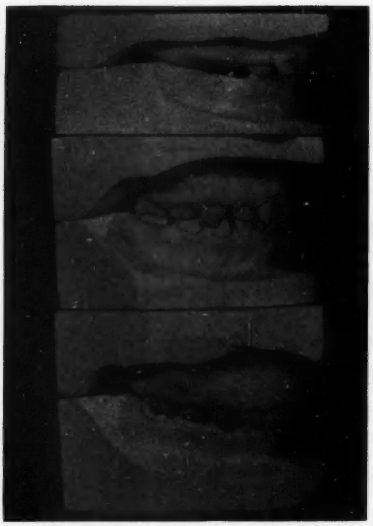

Fig. 2.—Models of *Case* 411 in which the molar occlusion became postnormal. Models taken at 2 years 5 months and 3½ years.

these are not usually part of a developmental pattern, but rather chance manifestations of the effect of environment on the occlusion of the teeth. Little evidence could be found among them, however, to indicate that the changes were associated with sucking habits, swallowing behaviour, or the relationship of soft tissues to the teeth.

Both Wallace (1927) and Logan (1952) have drawn attention to the importance of the intercuspal guidance of the first permanent molars at the time of their eruption in establishing a normal anteroposterior relationship. Wallace dismisses as negligible any similar effect of the deciduous molars on the grounds that their cusps are insufficiently well marked. Examination of these teeth at the time of their eruption, however, shows them to have well-marked and sharp cusps, which soon become worn down. The possibility that the engaging of these cusps as they come into occlusion may at times influence the path of closure, and hence the occlusion of the other teeth, cannot be overlooked. It has been found that the relationship of opposing teeth to each other before they establish contact is often rather inexact. Examples of this may be found in the slight buccal occlusion often shown by the

Table I.—Frequency Distribution of 40 Cases where a Change of Anteroposterior Occlusion occurred between 2½ and 3½ years

Change of Occlusion	*No. of Cases*
Normal to postnormal	17
Increasing postnormality	6
Decreasing postnormality	3
Postnormal to normal	11
Prenormal to normal	3
Total	40

upper first deciduous molars soon after their eruption (*Fig.* 4), and the cusp-to-cusp relationship seen in the case of the second deciduous molars (*Fig.* 5). In the majority of cases the teeth become guided to a more normal occlusion by the musculature and by the inclined planes of the cusps. It is conceivable that at times the occlusion may be sufficiently uncomfortable, or a slightly premature contact of cusps may occur to cause a change in the path of closure of the mandible. The resulting change of occlusion may become established, or may revert after attrition has worn off the offending cusps. An extreme degree of this is illustrated in *Fig.* 1; in this case a buccal occlusion of the upper molars on the left side developed at the time of the eruption of the first molars. This was associated with postnormal occlusion. While it is not possible to say with certainty whether the path of closure was normal at this stage, the dramatic subsequent improvement of the postnormality and buccal occlusion suggest that the path of closure had become restored to normal.

In 18 of the 40 cases the second deciduous molars were found to have been in occlusion at 2½ years of age, that is, before the changes of occlusion occurred. To ascertain whether this proportion was unduly high, a random 1 in 5 sample of the author's cases was examined; of 42 cases 21 were found to have had the second

deciduous molars in occlusion by 2½ years. It would appear, therefore, that there is not always a close association between changes of occlusion and the eruption of the second deciduous molars. However, in most cases some evidence was found of adjustments of mandibular position when the teeth were in occlusion. This was manifested as alterations in the relationship of the centre lines of the two arches; this occurred in 13 out of 17 cases which

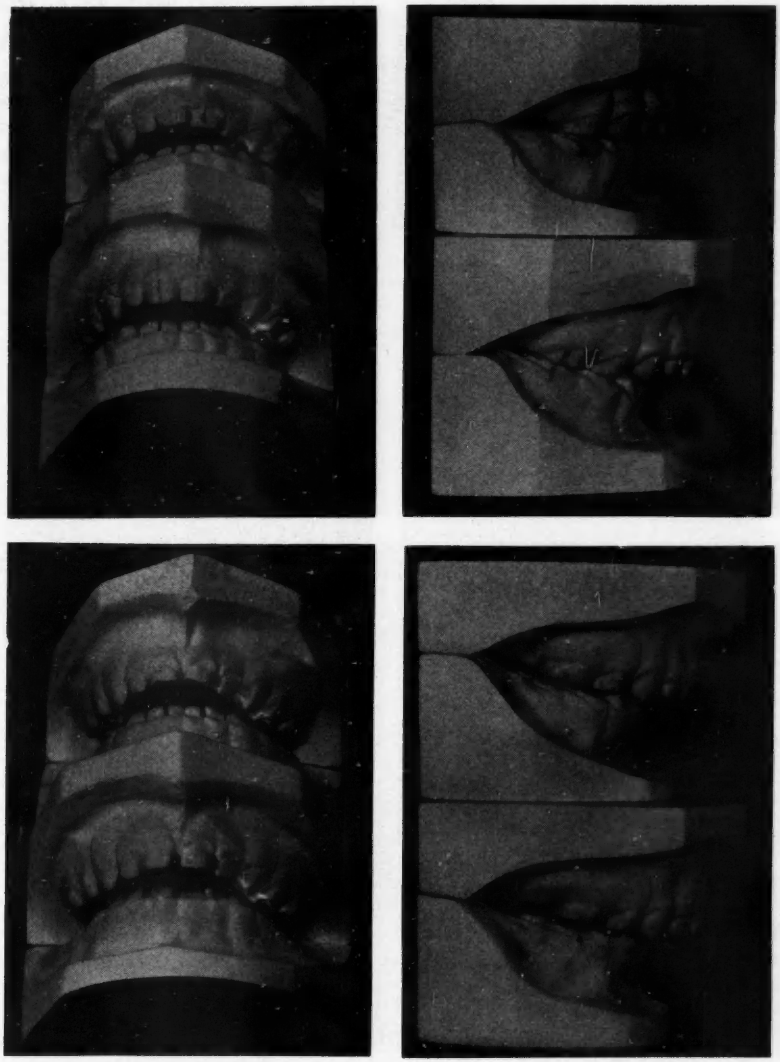

Fig. 3.—Models of *Case* 390 in which the molar occlusion became more postnormal, and a bilateral buccal occlusion developed. Models taken at 2 years 7 months, 3 years 7 months, 4½ years, and 6½ years.

improved, and in 17 out of 23 cases which deteriorated. Of the cases which improved (*Fig.* 3). Of all the 40 cases only 5 appeared to have a comfortably interlocking occlusion of the molars at 2½ years. These were all normal cases which deteriorated; none of them swallowed with the teeth together, 3 still indulged in sucking habits, and 4 had not the second deciduous molars in occlusion by 2½ years.

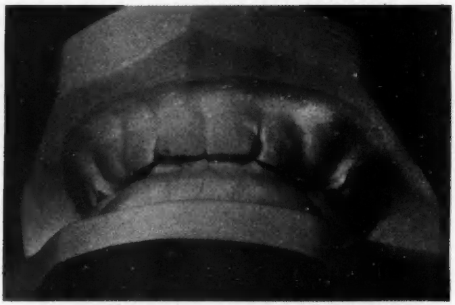

Fig. 4.—Models of *Case* 636 to show slight buccal occlusion of upper first deciduous molars, soon after their eruption. Model taken at 1 year 3 months.

It is suggested that the changes of relationship which take place spontaneously are usually readjustments of an uncomfortable occlusion. In some cases this may be stimulated by the eruption of the second deciduous molars and subsequent closure of molar spacing. It appears that environmental factors may only occasionally bring about these changes.

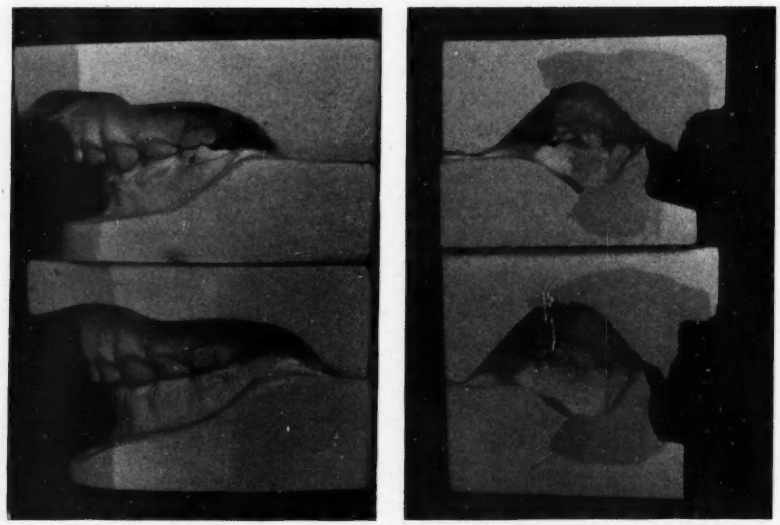

Fig. 5.—Models of *Case* 199 taken at 2½ years and 3½ years, to show the relationship of the second deciduous molars as they come into occlusion. Note the change of relationship of the lingual cusps and of the inclination of the lower molar.

anteroposteriorly, 1 acquired a cross-bite, 2 lost a cross-bite, and 2 lost a buccal occlusion. In 4 cases which deteriorated a lingual inclination of the upper incisors developed, and a further case acquired a buccal occlusion

REFERENCES

Bonnar, E. M. E. (1956), *Dent. Practit.*, 7, 42.
Chapman, H. (1908), *Trans. Brit. Soc. Orthodont.*, 1, 2.
Logan, W. Russell (1952), *Dent. Rec.*, 72, 219.
Wallace, J. Sim (1927), *Variations in the Form of the Jaws*, pp. 130, 131. London: Bailière, Tindall & Cox.